The Role of Perceived Scarcity and Anxiety on Panic Buying Behavior mong Customers in the United Arab Emirates

Abstract Although panic buying is rarely and inconsistently reported, it is recognised as an unpredictable human behaviour that has persisted throughout history, frequently manifesting in response to significant emergency situations. The objective of this study is to investigate the factors that influence panic purchasing behaviour among consumers in the United Arab Emirates. The objective of this study is to examine the influence of anxiety and perceived scarcity on panic buying behaviour, the mediating effect of anxiety on the relationship between perceived scarcity and panic buying behaviour, and the moderating effect of government interventions on the relationship between anxiety and panic buying behaviour. The online survey-based data from 157 respondents was collected using a convenient sampling method in this quantitative investigation. Partial Least Square Structural Equation Modelling (PLS-SEM) was implemented to analyse the data. The results of the data analysis showed that panic buying behaviour was significantly influenced by perceived scarcity and anxiety, while anxiety was also significantly influenced by perceived scarcity. Conversely, anxiety serves as a mediator between panic purchasing behaviour and perceived scarcity. The moderating function of government interventions in the relationship between anxiety and panic buying behaviour was not identified in this study. The findings underscore the significance of anxiety and perceived scarcity in the development of panic buying behaviour, thereby presenting policymakers with implications for the regulation of panic purchasing among consumers.

Keywords: Panic Buying, Consumer Behaviour, Government Interventions, Scarcity.

1. Introduction

Although panic buying is rarely and inconsistently documented, it is acknowledged as an erratic human behaviour that has endured over time, typically manifesting during significant emergency situations (Arafat et al., 2020). According to Khanra et al. (2021) and Talwar et al. (2021), the World Health Organisation (WHO) proclaimed the coronavirus a global pandemic in early 2020, which resulted in widespread panic buying in a number of countries worldwide. Many individuals rushed to stores to purchase essential products after the announcement of lockdowns, which were intended to control the spread of the virus (Bennett et al., 2020). A substantial amount of the media, including scholarly studies and social media, has suggested that consumers are stockpiling hygiene products, medications, and food items in anticipation of potential shortages (Debiec, 2020). It is a common occurrence during natural disasters, such as hurricanes, winter storms, or earthquakes, for individuals to stockpile essential goods, resulting in the majority of retail store shelves being empty.

Panic buying is a behaviour that is defined by the excessive acquisition of products in response to actual or perceived scarcity (Herjanto et al., 2021). The government's prediction of the Nepartak cyclone's impending arrival in 2016 resulted in a substantial wholesale purchase among individuals in Taiwan (Tsao et al., 2019). In the same vein, the SARS epidemic in China in 2003 led consumers to accumulate rice, vinegar, and medical supplies. Notable global emergency crises from previous years include the earthquake in Haiti, the nuclear incident in Japan, the H1N1 flu outbreak in China, and Hurricane Sandy in the United States (Wang et al., 2014). There was a discernible trend of panic purchasing in the United Arab Emirates (UAE), as individuals began to accumulate essential goods. Government advisories that advised the public to maintain social distancing and avoid congested areas in order to mitigate the spread of the COVID-19 virus were the driving force behind this behaviour, as there were concerns that supplies would diminish.

This issue highlights the necessity of analysing consumer behaviour in the context of panic buying scenarios. Despite heightened attention from governments and business organisations on disaster and crisis response, there is a notable deficiency in comprehensive information and prior research concerning the factors that influence consumer buying behaviour during these events (Hall et al., 2020). Research on panic buying behaviour remains limited, inconsistent, and occasionally contradictory (Islam et al., 2021; Iyer et al., 2020). Panic buying behaviour has received considerable attention in various studies (e.g., Cooper & Gordon, 2021; Omar et al., 2021; Billore & Anisimova, 2021; Li et al., 2021; Yuen et al., 2022; Prentice et al., 2022). This study examined multiple dimensions of panic buying behaviour, including its manifestation in particular contexts, the social determinants affecting it, prevention strategies, and the influence of national culture on its

frequency. Numerous studies have examined panic buying behaviour linked to crises and disasters in Western and other developed nations, including the UK (Hall et al., 2020), USA, Australia, Italy, and Germany (Debiec, 2020; Hall et al., 2020; Prentice et al., 2020). Despite extensive research on panic buying behaviour, a comprehensive study examining the interaction of perceived scarcity, anxiety, and government interventions in this context remains scarce.

The present study enhances existing literature by addressing following questions: What is the relationship between perceived scarcity and anxiety in the context of panic buying behaviour? Is anxiety a mediator in the relationship between perceived scarcity and panic buying behaviour? Does government interventions influence the relationship between anxiety and panic buying behaviour? This article is structured into several sections. This section reviews the existing literature and develops hypotheses, followed by the methodology of the current study, which encompasses research design, sampling methods, measurements, and data collection procedures. The subsequent section presents an analysis and discussion of the findings. The final section addresses the managerial implications.

2. Literature Review

This section analyses each hypotheses and substantiates it using relevant literature. The section initially addresses the direct relationship between perceived scarcity and anxiety, perceived scarcity with panic buying behaviour, and their interrelations, followed by the moderating effect of government intervention. Subsequently, the hypotheses are presented.

2.1. Panic buying behaviour

Over the past two decades, studies have documented a range of psychological responses that individuals display during infectious disease outbreaks, such as fear, anxiety, depression, grief, guilt, irritability, feelings of isolation, and stigmatisation (Sim et al., 2020). Researchers are now able to investigate the psychological responses linked to panic buying observed in various countries during the COVID-19 pandemic (Sherman et al., 2021). Panic is an emotional state that significantly influences human behaviour (Taylor, 2021). Panic purchasing is characterised as socially undesirable (Shoib & Arafat, 2021), irrational (Cao et al., 2023), and illogical (Alfuqaha et al., 2022). This behaviour manifests when a significant number of consumers hoard essential goods in response to periods of uncertainty and fear, aiming to mitigate a perceived future threat (Yuen et al., 2020).

Panic buying is an established economic phenomenon that frequently arises during major global crises, epidemics, or natural disasters, especially within the framework of behavioural economics (Yuen et al., 2020). Individuals begin to accumulate goods due to anxiety stemming from concerns about future availability, perceived scarcity, fear of losing control over their environment, and feelings of insecurity or instability. These factors are influenced by the intensity of current circumstances, crises, or pandemics (Arafat et al., 2020). This behaviour undermines social stability by disrupting supply chain balance, increasing prices, and obstructing access to protective resources for vulnerable groups (Billore & Anisimova, 2021). At present, empirical research on the causes and psychological mechanisms of this phenomenon during public emergencies is limited, and existing studies are fragmented (Chua et al., 2021; Yuen et al., 2020; Li et al., 2021). It is crucial to examine the underlying factors of panic buying, especially during public emergencies.

2.2. The Influence of perceived scarcity on anxiety

Anxiety emerges from the perception of personal danger or threat in such circumstances, accompanied by stress (Tan, 2023). Prati and Mancini (2023) propose a neuropsychological model of anxiety, characterising it as a central nervous system condition defined by a behavioural inhibition system (BIS). This system responds to new stimuli or those associated with punishment or absence of reward, inhibiting current behaviour while increasing arousal and awareness of the environment (Sherman et al., 2021). This system responds to new stimuli or those associated with punishment or absence of reward, inhibiting current behaviour while increasing arousal and attentiveness to the environment (Chorpita & Barlow, 2018). Recent advancements in cognitive and emotional theory suggest that anxiety significantly contributes to negative emotions (Sarallahi, 2021). Anxiety significantly contributes to the experience of negative emotions (Bakioğlu et al., 2021). Anxiety, unlike fear, typically does not have a defined target, and the severity of the negative emotions linked to anxiety may not correspond with objective circumstances (Tan, 2023).

Various scholars have analysed the factors contributing to and resulting from panic buying, utilising the scarcity principle, crowd psychology, and contagion theory. Empirical analyses demonstrate that panic buying can elicit strong feelings of guilt. Scarcity-induced stress may result

in anxiety, leading consumers to exhibit hoarding or panic buying behaviours (Singhn et al., 2023; Boccoli & Corso, 2023). Therefore, it is proposed that:

Hypothesis 1: There is a positive relationship between perceived scarcity and anxiety.

2.3. The Influence of perceived scarcity on panic buying behaviour

Perceived scarcity refers to an individual's understanding of limited availability. This motivates consumers to increase their purchases due to enhanced urgency or perceived product value (Suri et al., 2007). This may arise from the potential loss of freedom, which can heighten awareness and interest in the unattainable commodity, thereby increasing the motivation to acquire the imminent substitute that may soon be inaccessible (Gupta & Gentry, 2019). Reactance is a psychological motivational state triggered by the perception of limited freedom in performing specific behaviours, which may lead to panic buying behaviours (Yuen et al., 2022). This phenomenon arises when customers respond rapidly and impulsively to perceived scarcity as a means to reclaim lost autonomy (Chang et al., 2024).

Panic buying is defined by cognitive biases associated with perceived threats, scarcity, and maladaptive behaviours such as overspending (Cao et al., 2023). The primary aspect of the perceived scarcity model is the scarcity theory (De Bruijn & Antonides, 2022). The concept of scarcity is a fundamental economic issue arising from the limitation of resources in contrast to potentially infinite demands (Shi et al., 2020). Consequently, multiple studies indicate that scarcity influences the perceived value of a product (Zhang et al., 2022). This relates to the phenomenon of panic buying, wherein individuals may feel driven to acquire an item perceived as scarce (Omar et al., 2021). Shi et al. (2020) demonstrate that the value of any good increases with its scarcity. When an individual perceives an item as scarce, they may experience an increased motivation to acquire it to maintain their choices (Arafat et al., 2020). Thus, the following hypothesis is proposed:

Hypothesis 2: Perceived scarcity is positively associated with panic buying behaviour.

2.4. The Influence of anxiety on panic buying behavior

Anxiety is a broad or ambiguous sensation of imbalance (Mann et al., 2020) that arises from feelings of unease, tension, worry, or apprehension around potential outcomes (Knowles & Olatunji, 2020). An emotional state arises from internal (cognitive) or external (environmental) stimuli (Tuma & Maser, 2019). Anxiety arises from the interplay of stress and the impression of a threat posed by a negative consequence, regardless of the threat's actual existence (Sherman et al, 2021). It may cause individuals to behave awkwardly or enhance their efficacy by promoting proactive behaviours (Leong et al., 2021). In a condition of anxiety, consumers tend to exhibit risk-averse behaviour and perceive ambiguous cues as risky.

Past studies have explored how the perception of risk and the potential for adverse outcomes may have driven individuals to engage in extreme behaviours like panic buying as a means of safeguarding themselves from unfavourable circumstances following the onset of the COVID-19 pandemic (Yuen et al., 2020). It has been suggested that panic buying may assist individuals in alleviating the anxiety that arises from uncertainty and other negative emotions during a pandemic (Sim et al., 2020; Taylor, 2021; Yuen et al., 2020). Anxiety sensitivity is closely linked to fearfulness, and preliminary research suggests that it may serve as a risk factor for panic disorder (Alam et al., 2023). Epidemics bring about significant uncertainty, and individuals who struggle with this uncertainty and experience fear are more prone to heightened anxiety during times of widespread disease outbreaks (Taylor, 2019). The examination of the pandemic holds significant importance. Existing studies indicate that individuals often engage in specific purchasing behaviours as a means to consciously manage emotional distress. For instance, Liang et al. (2023) demonstrate that depression has a positive and significant effect on impulsive and compulsive buying behaviour.

In the context of epidemics, authorities implement various tiers of control measures, categorising regions into containment, control, and precautionary zones. Residents are mandated to adhere to home quarantine protocols and restrictions on the number of individuals and duration for essential purchases. The unpredictability surrounding future purchases, coupled with the uncontrollable progression of the epidemic and the market frenzy highlighted by online media, has heightened feelings of fear and anxiety among individuals. Thus, it is hypothesized that:

Hypothesis 3: Anxiety is positively related to panic buying behaviour.

2.5. The mediating role of anxiety in the relationship between perceived scarcity and panic buying behaviour

Panic buying can result in disruptions in the availability of specific product categories; however, it is emphasised by business experts and scholars that such behaviour is not directly triggered by supply shortages, but rather by elevated levels of consumer anxiety and fear (Kim et al., 2023). This anxiety and fear fundamentally stem from a perceived lack of time and resources. This phenomenon operates as a self-reinforcing cycle; as customers engage in impulsive and obsessive purchasing behaviours, anxiety surrounding scarcity increases, leading to quicker sell-outs of the product. Previous studies have suggested that panic buying is primarily triggered by interruptions in the availability of goods and services, such as natural disasters, pandemics, and extended strikes (Knowles & Olatunji, 2020). The presence of these stimuli induces feelings of panic or fear, driven by limited time and the number of individuals involved, resulting in impulsive and compulsive purchasing behaviours.

Moreover, it is also documented that anxiety partially mediates the relationship between stress and depression (Lianjie et al., 2023). Lee et al. (2011) discovered in their experimental study that anxiety mediates the relationship of stereotype threat and purchase intention of individuals in an automotive repair service context. Other study revealed how anxiety mediates the relationship between fear of Covid-19 infection, intolerance of uncertainty, and an individual's positive emotion (Bakioglu ˘ et al., 2020). Even, Otero-Lopez ´ and Villardefrancos (2013) found that anxiety is a mediator of the materialism influence (e.g. importance, and success) on consumers' addictive buying. As stated by scholars that the uncertainty of the span of the pandemic, the likelihood of having limited access to daily necessities, and a fear that there will be a disruption to the supply system may make people anxious and, consequently, induce panic buying so that they can get rid of their emotional turmoil (Sim et al., 2020; Yuen et al., 2020). Omar et al. (2021) confirmed that uncertainty increased consumer anxiety, which led to mediate the relationship between the scarcity and panic buying as well. Therefore, the following hypothesis is developed:

Hypothesis 4: Anxiety mediates the relationship between perceived scarcity and panic purchasing.

2.6. The Moderating role of government interventions on the relationship between anxiety and panic buying behavior

Numerous research investigations have demonstrated the necessity of government intervention in mitigating panic buying. Keane and Neal (2021), Chen et al. (2022), and Tang et al. (2022) highlighted the importance of government regulatory actions during panic events in reducing the prevalence of group buying and maintaining market stability. Mao et al. (2022) found that government intervention measures at different stages and the implementation of rumor-refutation strategies can affect the magnitude and frequency of public panic buying incidents. Kogan and Herbon (2022) identified the role of government oversight in three scenarios: (i) in the absence of panic, (ii) when the merchant possesses sufficient resources to address panic buying, and (iii) when rationing and sales interruptions are necessary. Additionally, Fu et al. (2021) observed that the timing of government external information dissemination significantly impacts the probability of ensuing panic buying occurrences. Fu et al. (2022) established that monitoring supply is a critical strategy for mitigating panic buying. Prentice et al. (2020) analysed the timed-intervention policy enacted by the government in response to the pandemic, emphasising the relationship between the timing of governmental measures and the occurrence of panic buying. Zhou et al. (2022) analysed the impact of punishment and subsidy mechanisms on the strategic decisions of government, enterprises, and consumers, concluding that the government penalty mechanism is more effective than the subsidy mechanism.

Keane and Neal (2021) noted that government policies, such as restrictions and lockdowns implemented during the initial phases of the epidemic, resulted in considerable public panic. The literature on intervention measures from a governmental perspective indicates that the government is the responsible entity during public health events. Governmental intervention methods can be classified into three primary categories: communication, prevention and control, and assistance (Kogan & Herbon, 2022; Wu et al., 2024). Gupta et al. (2021) found that effective government announcements can affect public anxiety and reduce panic buying behaviour.

Previous research indicates that government intervention can mitigate the impacts of panic buying by implementing rationing policies, enhancing supply chain efficiency, and launching public awareness campaigns (Barnes et al., 2021; Gazali, 2020). This increased the perception of resource scarcity and uncertainty, causing consumers to rely more on situational factors such as government actions, media messaging, and peer behaviour in their purchasing decisions, while also intensifying the fear of missing out (Esmark Jones et al., 2020). Governmental actions are expected to impact the relationship between panic buying and psychological effects, including anxiety levels. Government measures implemented during the pandemic, such as designated community hours for

essential workers and the elderly, aimed to protect vulnerable populations (Al Sakkal, 2023). These initiatives may improve clarity regarding the current situation and reduce the impacts of anxiety and panic buying. Panic buying behaviour functions as an internal source of anxiety, while government interventions are perceived as an external factor. Increased government involvement often leads individuals to associate their actions with external influences. Addressing the root causes of anxiety and fostering stability and fairness through government interventions can reduce the link between anxiety and panic buying, leading to more rational consumer behaviour. This will mitigate the impact of anxiety on panic buying behaviour. Therefore, it is suggested:

Hypothesis 5: Government intervention significantly moderates the relationship between anxiety and panic buying behaviour.

A theoretical model is developed that integrates the aforementioned hypotheses, illustrating the relationship between perceived scarcity and panic buying behaviour, with anxiety serving as a mediating factor and government intervention acting as a moderating variable. Figure 1 below illustrates this relationships.

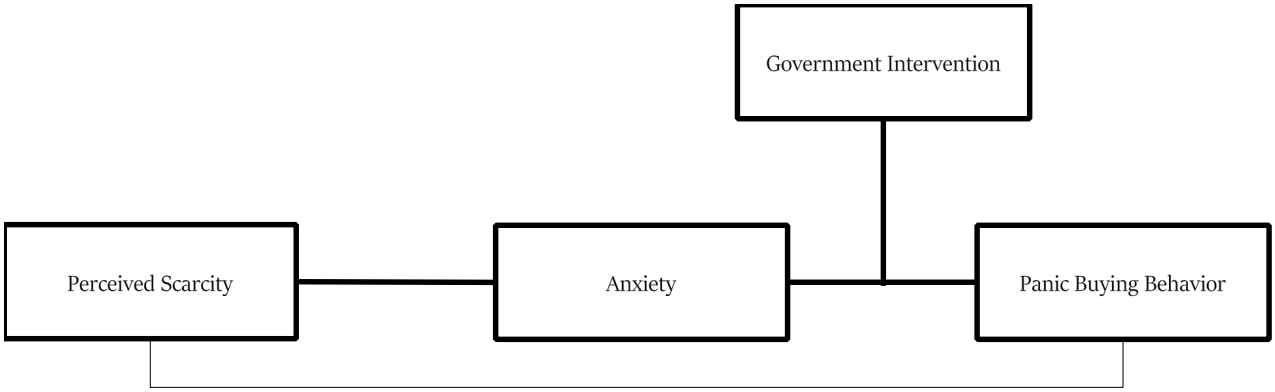

Figure 1 Research Framework

3. Methodology

3.1 Research design and sampling

This study examines the relationships between consumers' perceived scarcity, anxiety, and panic purchasing behaviours in the United Arab Emirates (UAE), particularly in the context of experiences during periods of uncertainty or perceived crisis, including pandemics, geopolitical tensions, natural disasters, weather alerts, and policy changes. This study concentrated on consumers who exhibited an increase in product purchases relative to their usual buying patterns. Data collection was conducted among consumers in three major cities in the UAE. The questionnaire was carefully designed to ensure participant representation, considering the wording, layout, and sequence of questions (Babin et al., 2019).

The online data collection method employed in this study facilitated engagement with a substantial number of respondents. A convenient sampling method was employed, utilising various media platforms such as Messenger, WhatsApp, Viber, and other applications to engage potential respondents. The questionnaire link was disseminated to potential respondents via these social networks. The questionnaire incorporated filtering questions, such as those pertaining to unusual purchases, to confirm that respondents met the criteria for participation in the study. A total of 250 participants were invited to participate in the study, with 157 consenting, yielding a response rate of 62.8 percent. A structured close-ended questionnaire was employed to collect the data. The questionnaire was designed for clarity and simplicity, enabling respondents to read and respond quickly, thereby maintaining their motivation to participate in the study (Omar et al., 2021).

3.2 Measurement of variables

The theoretical model illustrated in Figure 1, along with the corresponding hypotheses (H1 to H5), was assessed using the Structural Equation Modelling (SEM) methodology. Structural Equation Modelling (SEM) simultaneously analyses the relationships among various latent constructs while accounting for measurement errors. SEM effectively addresses measurement error, thus improving the accuracy of model estimation. In contrast to regression analysis, structural equation modelling allows for the simultaneous estimation of correlations with endogenous constructs. This technique is

frequently employed in the social sciences to identify and elucidate the causal relationships among a set of unobservable variables. The following sections offer a comprehensive examination of this process.

Panic buying behaviour is defined as the purchase of excessive quantities of goods in response to anticipated supply disruptions resulting from significant disasters or crises (Waseem et al., 2022). The measure of panic buying behaviour for this study was derived from the research conducted by Huan et al. (2021) and Chua et al. (2021), consisting of four items. Anxiety represents a generalised sense of disequilibrium characterised by feelings of unease, tension, worry, or apprehension regarding potential future events (Omar et al., 2021). It has been recognised as a significant factor influencing panic buying behaviour (Mcleod & Mcleod, 2020; Sobaih & Moustafa, 2022; Thomas & Mora, 2014). This study measured anxiety using instruments adapted from Mishra et al. (2022) and Omar et al. (2021), comprising six items. Perceived scarcity refers to an individual's understanding of limited availability (Chua et al., 2021). This prompts consumers to augment their purchases owing to heightened urgency or perceived value of the product. Five items, derived from Singh et al. (2021), were utilised to assess perceived scarcity. Government intervention is defined as the regulatory actions implemented by the government aimed at altering the decisions of individuals, groups, and organisations regarding social and economic issues (Barnes et al., 2021). The scale of four items developed by Hyland-Wood et al. (2021) and Barnes et al. (2021) was utilised to assess the concept of government interventions.

4. Analysis

Out of 250 respondents, 157 consumers completed the questionnaire, accounting for 62.8% of the total population. The results indicate that 54.8% of participants were female, whereas 45.2% identified as male. Among the surveyed participants, 54.8% identified as single, whereas 40.1% indicated they were married. 46.5% of the respondents were aged between 23 and 38 years. Subsequently, individuals aged 18–22 years constituted 27.4%, while those in the 39–54 years category represented 24.2%.

4.1 Common method bias

This research employed procedural and statistical methods to detect the potential presence of common method bias (CMB) (Podsakoff et al., 2012). All measurement scales employed in the study were initially sourced from previous research. This reduces ambiguous terminology and item ambiguity in the questionnaire. Secondly, a clearly defined initial criterion for the sample frame was established during the online survey data collection process to ensure compliance with the sample criteria and participation in the study. The implementation of online snowball sampling ensured the privacy and confidentiality of respondents' responses. The online survey included filtering questions to ensure the sample's representativeness (Tehseen et al., 2017).

As a result, the likelihood of common method bias was minimised in the design phase of the survey questions (MacKenzie & Podsakoff, 2012). The research utilised Harman’s single-factor test to evaluate common method variance (CMV) in the data as a statistical approach. The results demonstrated that a single factor shows a variance value below 50% (Podsakoff et al., 2012). The slight methodological variation suggested that common method variance was not a significant concern in the data. The correlations matrix procedure was utilised to evaluate the impact of CMV on the relationships among latent variables. The correlation among all constructs is less than 0.9. The findings suggest that common method bias is not a concern in this study (Pavlou & El Sawy, 2006).

4.2 Measurement model evaluation

This study evaluated the measurement model by testing the factor loading, Cronbach’s Alpha (CA), Composite Reliability (CR), and Average Variance Extracted for all constructs. Table 1 indicates that the outer loading of the indicators ranged from 0.628 to 0.862. Hair Jr. et al. (2017) assert that an outer loading of at least 0.708 is required for a measurement scale's indicators. Only variables with a content validity value exceeding 0.40 should be retained as indicators. All indicators' outer loading values exceed 0.628; therefore, this study incorporates all indicators.

The CA and CR values for the four latent variables—Anxiety, Government Intervention, Panic Buying Behaviour, and Perceived Scarcity—indicate that the lowest CA is 0.888 and the highest is 0.938. Conversely, CR values vary between 0.893 and 0.938. The internal consistency of the study's variables was assessed through the analysis of CA and CR, utilising a threshold value of 0.7

as recommended by Hair et al. (2017). The CA and CR of this investigation exceeded the recommended cut-off level value. Additionally, the AVE values of the constructs were evaluated in this study and were found to surpass the 0.5 threshold, ranging from 0.529 to 0.668. These findings affirm the convergent validity, consistency, and reliability of the constructs examined in this study.

Table 1 Results of Measurement Model

Latent Construct	Standardized loadings	CA (Cronbach's Alpha)	CR (Composite Reliability)	AVE (Average Variance Extracted)
Anxiety (AY)		0.938	0.938	0.668
AY1	0.798			
AY2	0.814			
AY3	0.821			
AY4	0.782			
AY5	0.825			
AY6	0.825			
AY7	0.862			
AY8	0.797			
AY9	0.832			
Government Interventions (GI)		0.937	0.938	0.666
GI1	0.761			
GI2	0.809			
GI3	0.752			
GI4	0.822			
GI5	0.842			
GI6	0.84			
GI7	0.835			
GI8	0.851			
GI9	0.829			
Panic Buying Behavior (PBB)		0.888	0.893	0.529
PBB1	0.628			
PBB2	0.774			
PBB3	0.768			
PBB4	0.738			
PBB5	0.681			
PBB6	0.671			
PBB7	0.743			
PBB8	0.769			
PBB9	0.756			
Perceive Scarcity (PS)		0.928	0.93	0.636
PS1	0.801			
PS2	0.773			
PS3	0.702			
PS4	0.777			

PS5	0.811			
PS6	0.825			
PS7	0.833			
PS8	0.834			
PS9	0.814			

This study analysed the latent variable covariance for each factor included in the study. Table 2 demonstrates a significant covariance between the latent exogenous and endogenous constructs, notably between anxiety and perceived scarcity, as well as between anxiety and panic buying behaviour. The covariance among the exogenous latent variables, particularly between government intervention and panic buying behaviour, indicates a moderate relationship. The findings indicate a notable correlation of 0.739 between anxiety and perceived scarcity, implying a significant relationship where heightened feelings of scarcity are closely linked to elevated anxiety levels.

The covariance between anxiety and panic buying behaviour is 0.722, indicating a strong correlation between elevated anxiety levels and panic buying behaviour. The notable correlation between perceived scarcity and panic buying behaviour (0.705) indicates that panic buying behaviour is likely to rise alongside perceptions of scarcity. The covariance between anxiety and government intervention, measured at 0.253, indicates a lower correlation between anxiety and overall impact. There is a noted association between government intervention and panic buying behaviour, though it is less significant than the relationship with anxiety, as evidenced by a moderate correlation of 0.37 between the two variables.

Finally, the covariance between government intervention and perceived scarcity is 0.336, indicating a weak correlation between perceived scarcity and an increase in overall effect. The interaction term between Government Intervention and Anxiety exhibits a significant positive covariance of 1.276, suggesting a strong relationship between these variables. The interaction between anxiety and government intervention appears to have a substantial effect. Government intervention exhibits moderate to weak correlations with other variables, while Anxiety maintains the strongest relationships with Panic Buying Behaviour and Perceived Scarcity. A significant factor is the interplay between anxiety and government intervention.

Table 2 Latent Variables Covariance

Variables	**Anxiety**	**Government Intervention**	**Panic Buying Behavior**	**Perceived Scarcity**	**Governmnet Internvention x Anxiety**
Anxiety	1	0.253	0.722	0.739	-0.147
Government Intervention	0.253	1	0.37	0.336	0.369
Panic Buying Behavior	0.722	0.37	1	0.705	-0.091
Perceived Scarcity	0.739	0.336	0.705	1	-0.167
Government Intervention x Anxiety	-0.147	0.369	-0.091	-0.167	1.276

This study also examined the scale's discriminant validity using the Heterotrait-Monotrait (HTMT) ratio approach. Hair et al. (2017) assert that HTMT yields more precise results when there is significant variation in the outer loadings of the measurement model. The results presented in Table 3 indicate that the HTMT values for all construct relationships are below the recommended threshold of 0.85, thereby demonstrating strong discriminant validity. The highest value observed is 0.789, indicating a significant association between anxiety and perceived scarcity. However, this value remains below the threshold, demonstrating that these two constructs are distinct. The discriminant validity of these variables is reinforced by the high yet acceptable correlation values observed between anxiety and panic buying behaviour (0.785), as well as between panic buying behaviour and perceived scarcity (0.769). The distinction between government intervention and other latent variables in the model is further evidenced by the lower correlation values, which range from 0.266 to 0.406, indicating weak relationships with the other constructs.

The distinction between this interaction term and other factors is further evidenced by the notably low values of Government Intervention and Anxiety across all constructs, with the highest correlation between Government Intervention and Anxiety recorded at 0.338. The results confirm the discriminant validity of the scale.

Table 2 Discriminant validity assessment (Heterotrait- Monotrait Approach)

Variables	Anxiety	Government Intervention	Panic Buying Behavior	Perceived Scarcity	Government Intervention x Anxiety
Anxiety					
Government Intervention	0.266				
Panic Buying Behavior	0.785	0.406			
Perceived Scarcity	0.789	0.358	0.769		
Government Intervention x Anxiety	0.134	0.338	0.085	0.153	

This research examines a direct relationship between panic buying behaviour of fast-moving consumer goods among expatriates in the UAE, anxiety, perceived scarcity, and government intervention. Furthermore, the mediating function of anxiety in the relationship between panic buying behaviour and perceived scarcity was also investigated. Furthermore, the structural model and the hypotheses developed in this investigation were assessed using the R^2 (variance explained), the f^2 (effect size), and the significance of the variables' path coefficients. Additionally, potential multicollinearity issues in the model were evaluated using the VIF (Variance Inflation Factor) as illustrated in Table 4.

The VIF values for all independent variables in the model are below 5, which is the recommended cut-off level set by Akinwande et al. (2015). This suggests that there were no significant multicollinearity concerns. In particular, the VIF for Perceived Scarcity ⇒ Panic Buying is 2.402, which is still within the acceptable range. Immediately following this, the VIF for Anxiety → Panic Buying is 2.207, indicating a moderate but acceptable level of multicollinearity. Then, Government Intervention → Panic Buying Behaviour with a VIF of 1.347 and Government Intervention × Anxiety → Panic Buying with a VIF of 1.223 both exhibit minimal multicollinearity. Finally, Perceived Scarcity → Anxiety with a VIF of 1, indicating that there is no collinearity with other variables. Consequently, this analysis confirms that multicollinearity is not a concern in this model, thereby guaranteeing the reliability of regression estimates.

Table 3 Variance Inflated Factor (VIF)

Independent Variables	VIF
Anxiety -> Panic Buying Behavior	2.207
Government Intervention-> Panic Buying Behavior	1.347
Perceived Scarcity -> Anxiety	1
Perceived Scarcity -> Panic Buying Behavior	2.402
Government Intervention X Anxiety -> Panic Buying Behavior	1.223

Meanwhile, a bootstrapping procedure was implemented to evaluate the path coefficient, standard error, and t-statistics (n=134, sample = 5000). The majority of the relationships in the model are statistically significant, with all but one path having crucial t-values that surpass the 0.1% level, as demonstrated by the results of a one-tailed test. Anxiety has a significant impact on panic purchasing behaviour ($t = 6.606$, $p < 0.001$). It also demonstrates that it is significantly influenced by perceived scarcity, with anxiety serving as a mediator ($t = 6.374$, $p = 0.001$). Similarly, perceived scarcity is a highly predictive factor for panic buying behaviour ($t = 4.617$, $p < 0.001$) and anxiety ($t = 18.028$, $p < 0.001$). However, the interaction between anxiety and government intervention does

not significantly affect panic purchasing behaviour (t = 0.645, p = 0.519), suggesting that government intervention has a modest moderating influence on this connection. This illustrates that panic purchasing behaviour is directly influenced by anxiety and perceived scarcity, with interaction effects having minimal to no effect. Additionally, the results demonstrate that the R2 values for panic purchasing behaviour and anxiety are 0.546 and 0.606, respectively, indicating moderate to strong explanatory power. Table 5 and Figure 2 below illustrate the outcomes of the measurement model for the direct and indirect relationships among the variables of this investigation.

Table 4 Result of Measurement Model

Hypothesis	Relationship	Std. Beta	Std Error	*t*-values	p-values	Decision	R^2
H1	Perceived Scarcity -> Anxiety	0.739	0.0006	18.028	0	Supported	0.546
H2	Perceived Scarcity -> Panic Buying	0.322	0.0010	4.617	0	Supported	0.606
H3	Anxiety -> Panic Buying	0.441	0.0009	6.606	0	Supported	
H4	Perceived Scarcity -> Anxiety -> Panic Buying	0.326	0.0007	6.374	0	Supported	
H5	Government Intervention X Anxiety -> Panic Buying	-0.025	0.0005	0.645	0.519	Not supported	

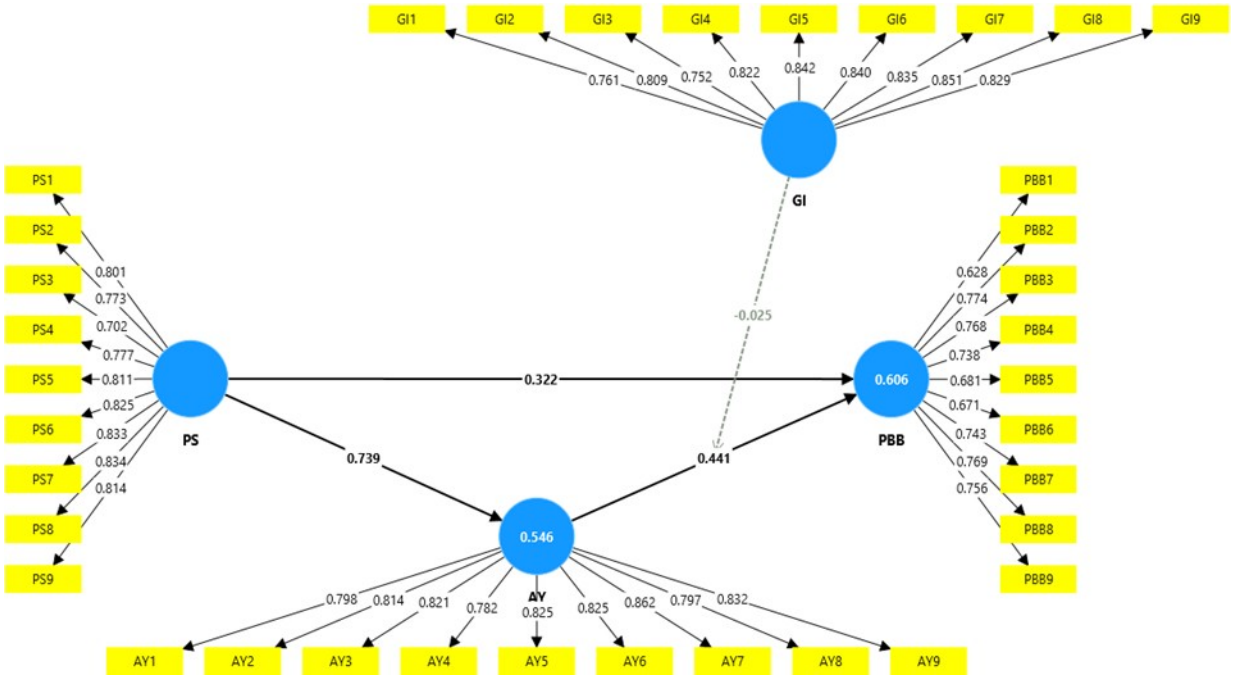

Figure 2 Structural Model

The relationship between perceived scarcity and anxiety accounts for 54.6% of the variance in anxiety (R2 = 0.546), as evidenced by a significant relationship (Std. Beta = 0.739, *t* = 18.028, p = 0) and a high effect size (*f*2 = 1.204). This suggests that perceived scarcity has a substantial impact on anxiety. This implies that H1 is accepted. Additionally, there is a substantial correlation between panic purchasing behaviour and perceived scarcity (Std. Beta = 0.322, *t* = 4.617, p = 0). The variance in panic purchasing behaviour is explained by 60.6% (R2 = 0.606), and the effect size is small (*f*2 = 0.109). In spite of this, H2 is supported. In addition, the findings indicate that there is a significant relationship between anxiety and panic buying behaviour (Std. Beta = 0.441, *t* = 6.606, p = 0) and a relatively small effect size (*f*2 = 0.223). Consequently, H3 is also accepted. Meanwhile, the significant mediation (Std. Beta = 0.326, *t* = 6.374, p = 0) supports the role of anxiety as a

mediator, further indicating that H4 is also supported. Nevertheless, H5, which investigates the moderating effect of government intervention on the relationship between anxiety and panic purchasing behaviour, is not supported due to the non-significant relationship (Std. Beta = -0.025, t = 0.645, p = 0.519). There is no evidence to support the moderating effect of government intervention, but the overall result suggests that perceived scarcity has a significant influence on anxiety and indirectly influences panic purchasing behaviour.

5. Results and discussion

This study's results indicate that anxiety is significantly influenced by perceived scarcity, which is in accordance with the existing literature. The Stimulus-Organism-Response (S-O-R) framework, as posited by Mehrabian & Russell (1977) and Islam et al. (2018), bolsters this relationship by contending that external stimuli, such as perceptions of scarcity, can affect an individual's emotional state, such as anxiety, which in turn influences behaviour. The results are consistent with previous research that has demonstrated that scarcity elicits a sense of urgency and the perceived risk of unavailability. They also indicate that perceived scarcity functions as a potent stimulus, causing anxiety (Donovan & Rossiter, 1982; Liu et al., 2016). Individuals who suffer from anxiety may participate in activities such as panic purchasing due to their perceived obligation to acquire scarce resources. The S-O-R model, which emphasises that environmental stimuli influence emotional and cognitive states, which in turn influence behavioural outcomes, has been extensively employed to elucidate such consumer behaviour, as stated by Fiore and Kim (2007). The role of anxiety as an organismic variable in this paradigm further substantiates its relevance in linking perceived scarcity to consumer behaviour. In a study conducted by Islam et al. (2018), the desire to take immediate action to mitigate potential risks is heightened by increased anxiety, which in turn intensifies feelings of urgency and scarcity. The results also corroborate the empirical research conducted by Chang et al. (2011), which employed the S-O-R model in online and retail environments. This research demonstrates the model's adaptability in documenting the dynamic interaction of emotions, behaviour, and stimuli.

Additionally, the findings that panic purchasing behaviour is influenced by perceived scarcity are in accordance with the research conducted by Court et al. (2009) and Grier and Davis (2013). They discovered that individuals respond promptly to the acquisition of limited resources when they perceive scarcity, regardless of whether it is transient or permanent. This disrupts the iterative consumer decision-making process. This behaviour was notably evident during the COVID-19 pandemic, when widespread panic buying was precipitated by shortages of essential items such as medical protective equipment (Li et al., 2020). Consumer responses are exacerbated by varying degrees of scarcity, whether macro, communal, or individual, contingent upon the severity of the perceived shortage (Cannon et al., 2019).

Consumers' anxiety and dread of missing out are intensified by the perception of scarcity, which results in impulsive behaviours such as panic buying, as per Hodkinson's (2016) research. For instance, the pressure to store commodities was exacerbated by the reduced availability of necessities during the epidemic, even among customers who were not directly affected by shortages. The significance of scarcity as a significant external stimulus is underscored by these findings, which disrupt the consumer's logical decision-making cycle and instigate emotional reactions that prioritise short-term benefits over future planning. This study contributes to the existing body of research and corroborates the findings of Arafat et al. (2020) and Arafat et al. (2021). The authors argue that in order to prevent irrational customer behaviour during future crises, it is crucial to implement strategies that alleviate feelings of scarcity, such as improved inventory control and transparent communication.

Yuen et al. (2020) and Sobaih and Moustafa (2022) assert that consumers resort to panic purchasing as a coping strategy to regain a sense of security during times of crisis, as a result of increased health and resource availability concerns. The role of anxiety in panic purchasing is further supported by the Behavioural Immune System (BIS) theory, which posits that perceived risks induce defensive responses to mitigate injury (Schaller, 2011). This is in accordance with research that indicates that consumers reorganise their surroundings through stockpiling as a response to anxiety that is exacerbated by feelings of scarcity and severity (Rapolienė et al., 2019).

The S-O-R theory is also found to be consistent with the recognition that anxiety serves as a mediator in the relationship between anxious buying behaviour and perceived scarcity. According to this paradigm, the perception of scarcity serves as an external stimulus that exacerbates physiological and emotional states, including anxiety, thereby stimulating panic purchasing behaviour (Mehrabian & Russell, 1977). Lianjie et al. (2023) suggest that anxiety is emphasised by this mediation effect as a critical organismic variable that converts external stimuli into beneficial

reactions, particularly in unpredictable circumstances such as the COVID-19 pandemic. According to Omar et al. (2021), anxiety is exacerbated by the perception of scarcity, which leads individuals to acquire items that are not urgently required out of concern that resources will be depleted. Panic purchasing is further exacerbated by anxiety, which intensifies the sense of urgency and uncertainty in response to the anticipated scarcity (Lianjie et al., 2023).

The results of the analysis indicate that government intervention is ineffective in moderating the relationship between anxiety and panic buying, as these behaviours are predominantly influenced by profound emotional and psychological factors, such as fear, distrust, and social contagion. Despite the fact that governmental actions may mitigate certain logistical factors that contribute to panic purchasing, such as disruptions in the supply chain, they often fail to address the fundamental emotional triggers that consistently drive individuals towards irrational, self-preserving actions. The current finding is in accordance with the findings of Park et al. (2022), who determined that government interventions, including price caps and supply chain reassurances, were ineffective in moderating the relationship between anxiety and panic purchasing. Conversely, Yuen et al (2020) discovered that policies such as rationing or pricing restrictions, transparent supply chain management, and effective government communication could mitigate the effects of anxiety on panic purchasing. Sim et al (2020) also found that clear and timely government interventions reduced public anxiety and perceptions of scarcity, which in turn decreased panic purchasing behaviours. Similarly, the present finding is inconsistent with this.

The fact that anxiety is a significant emotional state that may lead to irrational decision-making is likely the reason for the insignificant moderating influence of government intervention on the relationship between anxiety and panic purchasing. In situations where individuals feel a loss of control, they frequently turn to actions like panic buying as a way to regain their sense of security. Despite the implementation of government interventions such as public announcements or rationing systems, the emotional response of anxiety can often take precedence, causing individuals to prioritise their own survival over the reassurance provided by collective measures.

6. Managerial implications and conclusions

This study offers a number of practical contributions that can assist researchers, practitioners, and policymakers in understanding and addressing panic purchasing behaviours during public health crises, such as the COVID-19 pandemic and disasters. The study's results elucidate the direct relationships between scarcity perceptions, anxiety, and panic buying behaviours. The positive associations observed between perceived scarcity and anxiety underscore the role of digital platforms and supply-related stressors in exacerbating consumer anxieties and driving panic buying behaviours. This provides decision-makers with valuable insights into the management of panic purchasing and improves their preparedness for potential future natural disasters, geopolitical crises, or pandemics that may lead to panic buying behaviours. Initially, it is imperative to implement effective measures to mitigate the spread of panic buying, given the impact of emotional reactions and perceived scarcity on panic purchasing. Secondly, the media is essential for the dissemination of information and the formulation of public perceptions; as a result, the inclination to exaggerate information should be restricted. It is imperative that the sources of information acknowledge their responsibility to prevent the dissemination of rumours and misinformation.

The mediation analyses also underscore the critical role of anxiety in mediating the relationships between scarcity perceptions and panic buying behaviours. This underscores the potential of targeted interventions, such as government communications and supply chain management strategies, to moderate anxiety levels and subsequently reduce panic-driven consumer responses. Particularly, it can decrease panic purchasing and promote consumer well-being during public health emergencies. Furthermore, in order to mitigate instances of stock-outs, appropriate limits and quotas may be implemented for products. The perception of scarcity and anxiety that are often associated with substantial purchases will undoubtedly be reduced by this. Additionally, in order to effectively manage uncertainties, organisations should enhance their supply chain and logistics resilience. In order to effectively address the requirements and collect real-time data, advanced technologies such as blockchain, IoT, and big data analytics can be employed.

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Ethical considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.